it does not do so, the reaction is practically certain to proceed by some other path.

From the whole tone of the book, one is led to place great confidence in the conclusions reached by the author. The collection of so many data in such accessible form is a great boon to biological chemists.

(2) The first edition of Dr. Armstrong's monograph was reviewed in NATURE nearly three years ago (May 19, 1910). The second edition is larger, and the cost is greater.

This subject has such a large literature that there was some danger that the monograph might have been a condensation of some dull and monumental work. Fortunately, the author has avoided that entanglement, and has presented a comprehensive survey of his subject without making his book a chemical inventory. The chemistry of typical carbohydrates is described, and their relationship to other sugars is indicated. Excellent tables give the required data, so that the train of thought is not interrupted by unnecessary details. After reading the monograph, one can see a connection between α- and β-glucosides, their relation to enzymes, the cause of mutarotation, and many other interesting phenomena.

Both these monographs ought to be read by all physiologists and biological chemists, as they contain much information about their respective subjects, and in addition they are well written with a broad view as to the general problems involved.

H. E. R.

BOOKS ON FORESTRY AND ARBORICULTURE.

(1) *Illustriertes Handbuch der Laubholzkunde.* By Camillo Karl Schneider. Lieferung 6-12. Pp. v + 1070. Price 34 marks. Register. Pp. vii + 136. Price 5 marks. (Jena: Gustav Fischer.)

(2) *The Story of Our Trees in Twenty-Four Lessons.* By Margaret M. Gregson. Pp. xii + 160. (Cambridge: University Press, 1912.) Price 2*s.* 6*d.* (Cambridge Nature Study Series.)

(3) *Forestry in New England.* A Handbook of Eastern Forest Management. By Prof. R. C. Hawley and Prof. A. F. Hawes. Pp. xv + 479. (New York: John Wiley and Sons; London: Chapman and Hall, Ltd., 1912.) Price 15*s.* net.

(4) *Identification of the Economic Woods of the United States.* Including a Discussion of the Structural and Physical Properties of Wood. By Prof. Samuel J. Record. Pp. vii + 117 + 6 plates. (New York: John Wiley and Sons; London: Chapman and Hall, Ltd., 1912.) Price 5*s.* 6*d.* net.

(5) *Lightning in Relation to Forest Fires.* By F. G. Plummer. Pp. 39. (U.S. Dept. Agric., Forest Service. Bulletin 111. Washington, 1912.)

(1) THE number of trees and shrubs in cultivation in the open air in this country is astonishing. Numerous new introductions have been made of late years, mainly from China, where the discoveries of Dr. A. Henry and Mr. E. H. Wilson have opened up an immense region, replete with new and hardy species. No complete treatise on the subject has appeared in English since Loudon published his classic work, "Arboretum et Fruticetum Britannicum," in 1838, and the abridgment, "Trees and Shrubs," in 1842. We have had to depend upon German text-books. The best of these, Koehne's "Deutsche Dendrologie," was published in 1893, and is now out of date.

We hail, then, with great pleasure the appearance of the concluding part of Schneider's great work, which deals with broad-leaved trees and shrubs, the conifers not being included. This is in two volumes, the first comprising 810 pages and 460 figures, the second 1070 pages and 628 figures, supplemented by a separate index of names, covering no fewer than 136 pages. The whole forms an indispensable text-book for all interested in arboriculture and horticulture. The descriptions are short, but accurate; the references are numerous and exact. Varieties and sports, which were omitted in Koehne's work, are briefly mentioned by Schneider.

As his regions of cultivation extend from the Baltic to Istria, most of the genera which are cultivated in England are taken up; but there are curious omissions. Eucalyptus is not referred to, yet no fewer than twelve species find a home in the west of England and Scotland, and in most parts of Ireland. The account of monocotyledonous trees and shrubs is very limited. While Yucca, Ruscus, Smilax, and Agave are included, no mention is made of palms like Trachycarpus, or of any of the bamboo tribe. A translation of Schneider's treatise into English would be a very useful book, which would, in all probability, command a ready sale.

(2) "The Story of Our Trees" is a book for school-teachers, apparently ignorant of botany, who wish to interest their pupils in the study of trees. There are twenty-four lessons, the best of which are those dealing with planting and felling. The author does not seem to be well acquainted with the special botany of trees, as she prefers often to take her illustrations from humbler plants. One would have selected the germination of the oak rather than that of the broad bean, which is

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prescribed for study. The fruits figured include those of sweet pea, wallflower, pansy, and dandelion. There are curious errors. The "pine" cone figured on p. 11 is the cone of the common spruce. On p. 26, the casting of twigs, a peculiar process best seen in poplars (which are not mentioned in the vague account), is confused with the natural pruning of the branches of trees due to shade. The flowers of Eucalyptus and Cactus will not be available in many schools; and teachers are directed to purchase these in a shop somewhere in Yorkshire. There is no lack of material for the study of trees, even in large towns; and the lessons would be most valuable if all the material to be studied were gathered by the children themselves.

(3) "Forestry in New England" is an interesting book intended for the general reader. The first part is an account in simple language of the general principles of silviculture, with short chapters on cognate subjects, like forest fires, insect and fungoid pests, timber valuation and measurement, &c. The second part is more novel and valuable, being a description of the forests of New England at the present day. There are excellent chapters on their area, composition, modes of management, and financial returns. To the student of ecology, the account of the four forest regions, with their subordinate types, will be of great interest. The most important region, which includes the most elevated parts of the country, is dominated by the red spruce. The author mentions a remarkable fact, that wherever planting is resorted to, the European spruce (*Picea excelsa*) is a much superior tree to the native species (*Picea rubra*), as it grows much faster and yields better pulp-wood. The book contains much information that is new, and of great interest to both the botanist and the forester.

(4) Prof. Record's treatise is a most valuable contribution to our knowledge of the numerous kinds of wood which are of economic importance in the United States. The different species are admirably distinguished in the concluding part of the book. The first part presents, perhaps, in a clearer light than anything hitherto published in English the salient points in the study of the structural and physical properties of wood in general, each section being supplied with a well-chosen bibliography, which will be of great service to students. This book should be in the hands of foresters, architects, engineers and others who have to deal with the identification and uses of timber.

(5) In U.S. Forestry Bulletin No. 111, Mr. Plummer sums up an investigation that has been made in the United States on the liability of trees to be struck by lightning. Observations were taken during the past five years by nearly 3000 forest officers over a territory about 200,000,000 acres in area. Lightning is one of the chief causes of forest fires in America, being second only to sparks of locomotives as a source of conflagration. Lightning either ignites the tree itself, or probably more often sets fire to the humus at its base.

Mr. Plummer's conclusions are opposed to the current belief that some species of trees are more liable to lightning-stroke than others. According to Fischer's theory, oak and poplar, the wood of which contains much starch, are good conductors and attract lightning; while birch and beech, which have wood containing much oil, are bad conductors and escape. Mr. Plummer denies this, being of the opinion that "the greatest number of trees struck in any locality will be of the dominant species." He agrees, however, with previous writers that trees taller than others, those in an isolated position, and those with deep roots, are most in danger from lightning. Trees in general are most liable to be struck when their conductivity is increased, as is the case when their stems are wet with rain.

European statistics show that the species most often damaged by lightning on the Continent is the black Italian poplar (*Populus serotina*). The explanation is simple. This tree is extensively planted, always in more or less isolated positions, as along roads or in pastures, or on the sides of streams; moreover, it grows to a much greater height than the other species that are planted in similar situations. Mr. Plummer is in error in supposing this poplar, which is of hybrid origin, to be identical with the American *Populus monilifera,* which is usually a moderate-sized tree with a rounded crown, seldom struck by lightning in its native country.

OUR BOOKSHELF.

Primeval Man: The Stone Age in Western Europe. By A. Hingston Quiggin. With an introduction by Dr. A. C. Haddon, F.R.S. Pp. 140. (London: Macdonald and Evans, 1912.) Price 1*s*. 6*d*. net

MRS. QUIGGIN has succeeded remarkably well in a praiseworthy attempt at striking the mean of anthropological opinion on primeval man, for the benefit of "the hard-working primary teacher or for upper forms." The value of that opinion on many points may be reasonably questioned, and the task of compiling a didactic work on the subject must have been a very difficult one. The author, however, cannot be held responsible for canvassed opinions. But who, in such a case, is responsible for the omission from such a book of most material evidence, as definitely scientific as

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